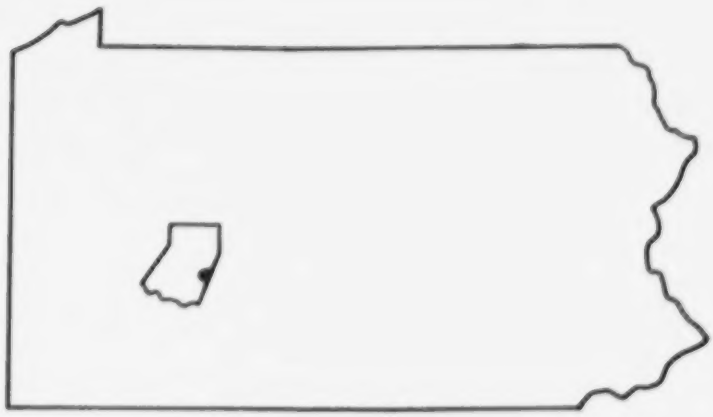
FLOOD INSURANCE STUDY

TOWNSHIP OF EAST WHEATFIELD, PENNSYLVANIA
INDIANA COUNTY



AUGUST 2, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - **421716**

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: August 2, 1990

Flood Insurance Study Revised:

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FLOOD INSURANCE STUDY
TOWNSHIP OF EAST WHEATFIELD, INDIANA COUNTY, PENNSYLVANIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of East Wheatfield, Indiana County, Pennsylvania, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the Pittsburgh District of the U. S. Army Corps of Engineers (COE) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-86-E-2226, Project Order No. 2. This work was completed in May 1988.

1.3 Coordination

On May 31, 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the township, and the COE (the study contractor) to determine the streams to be studied by detailed methods.

On July 12, 1989, a final CCO meeting was held with representatives of FEMA, the township, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of East Wheatfield, Indiana County, Pennsylvania. The Borough of Armagh is located within the Township of East Wheatfield, but is not included in this study. The area of study is shown on the Vicinity Map (Figure 1).

The Conemaugh River was studied by detailed methods for its entire length within the community. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through May 1993.

Blacklick Creek was studied by approximate methods for its entire length within the community. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Township of East Wheatfield.

2.2 Community Description

The Township of East Wheatfield is located in southeast Indiana County in central-western Pennsylvania. It is bordered by the Townships of Brush Valley and Buffington to the north, the Township of Jackson and the Borough of Vintondale to the east, the Township of St. Clair and the Borough of Seward to the south, and the Township of West Wheatfield to the west. The township has a land area of 27.1 square miles, and lies approximately 15 miles south of the Borough of Indiana. The population of the township was 2,844 in 1980, an 18 percent increase from 2,419 in 1970 (Reference 1).

The Conemaugh River has a total drainage area of approximately 1,372 square miles at its confluence with Loyalhanna Creek, which it joins at Saltsburg to form the Kiskiminetas River. It flows towards the northwest from Johnstown, through Westmoreland, Cambria and Indiana Counties, impounded along the way by Conemaugh River Lake. The total reach of the Conemaugh River from Johnstown to Saltsburg is approximately 52.5 miles. The length of the Conemaugh River studied by detailed methods begins at river mile 39.64 and extends for a total distance of 6.51 miles, to river mile 46.15. The average gradient is approximately 7.4 feet per mile. Local relief above the stream valley varies from a low of 1,060 feet to an average hilltop elevation of 2,300 feet. The valley floor varies from 200 to 1,000 feet in width.

The climate for the Township of East Wheatfield and its surrounding area is temperate, with the normal seasonal variation in temperature. The area is geographically located in a region of variable air-mass activity, and is subjected to polar and tropical, continental and maritime air-mass invasions. The weather is usually moderate, but is subject to frequent and rapid changes as a result of air-mass movement. Temperatures range from highs between 90

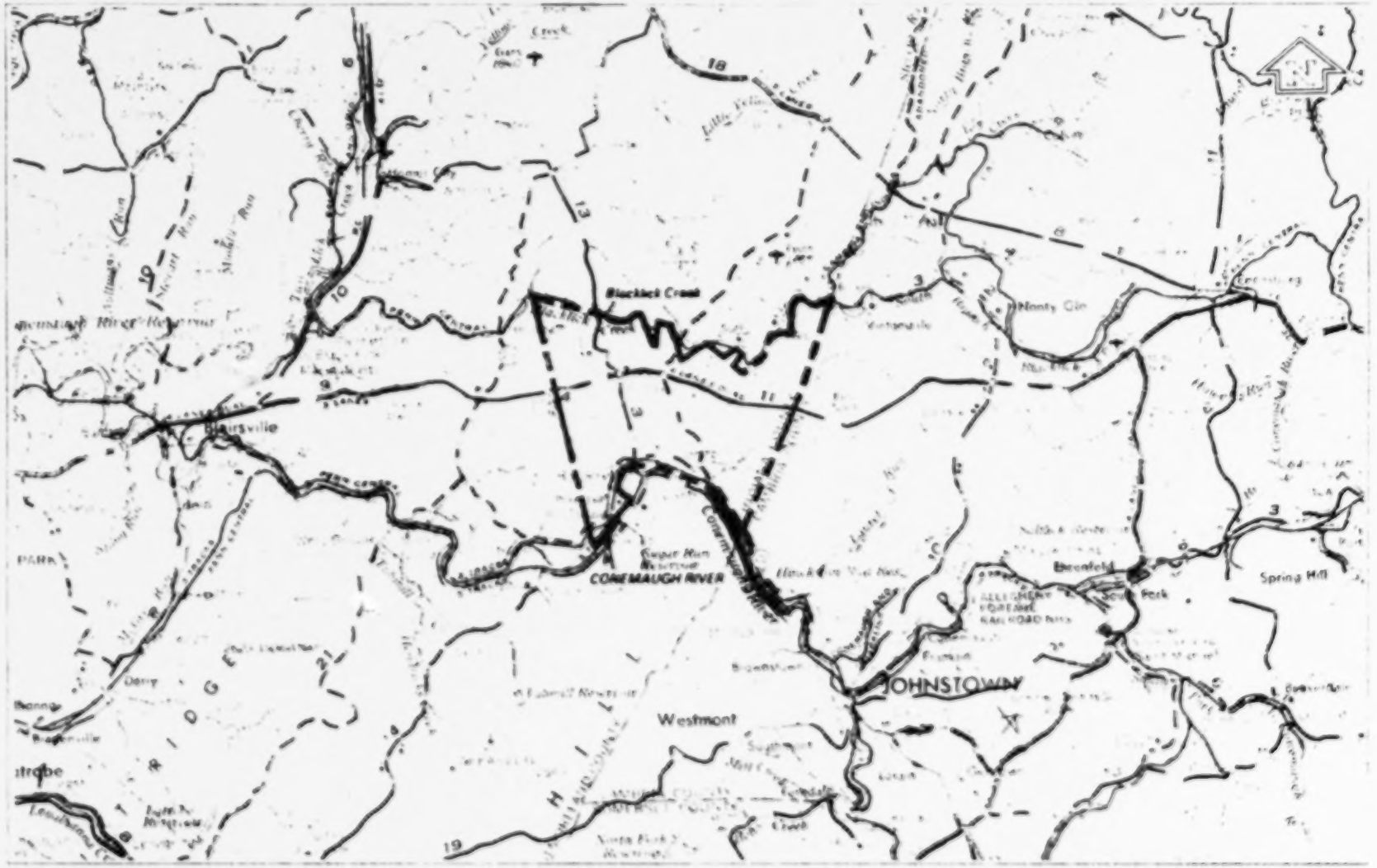


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST WHEATFIELD, PA

(INDIANA CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

degrees Fahrenheit (^{o}F) and 99^{o}F to lows below 0^{o}F. Measurable precipitation occurs an average of 92 days a year and amounts to an annual average of approximately 45 inches.

2.3 Principal Flood Problems

Major floods have occurred along the Conemaugh River at various times of the year. Floods occurring in the winter and spring months are usually the result of heavy rainfall and snowmelt. Floods occurring in the summer months are usually the result of high-intensity, short-duration storms. It is possible for large floods with a duration of several days to occur at any time of the year.

The maximum flood of record along the Conemaugh River in the Township of East Wheatfield occurred in July 1977 when the river rose to a gage height of 27.06 feet at Seward. The following tabulation shows major floods of record as measured at the U. S. Geological Survey (USGS) gaging site No. 03041500 at Seward, at river mile 42.85. Gage zero equals 1,076.02.

Date of Crest	Stage (feet)	Elevation (feet)	Discharge (cfs)
July 20, 1977	27.06	1,103.08	115,000
March 18, 1936*	22.80	1,098.82	90,000
October 16, 1954	19.20	1,095.22	60,000
June 23, 1972	18.93	1,094.95	57,000
March 31, 1940	15.22	1,091.24	34,000
March 6, 1967	14.14	1,090.16	29,200
February 25, 1961	14.02	1,090.04	29,000
March 6, 1945	13.76	1,089.78	27,500
April 3, 1970	13.46	1,089.48	26,500

*Estimated from high-water marks

2.4 Flood Protection Measures

No flood protection measures have been taken to alleviate flooding along the Conemaugh River within the Township of East Wheatfield.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare

flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied in detail affecting the community.

The flood-frequency discharge values for the Conemaugh River were taken from the Flood Insurance Study for the Township of St. Clair (Reference 2). In that study, the natural discharge-frequency curves on the Conemaugh River were developed by a standard log-Pearson Type III analysis as outlined in USGS Bulletin 17B (Reference 3). The stage discharge records used in the analysis of the Conemaugh River were obtained from the USGS gaging station at Seward, covering a 43-year period.

A summary of the drainage area-peak discharge relationships for the stream studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
CONEMAUGH RIVER					
At Seward gaging station No. 03041500	715.0	45,000	83,000	104,000	163,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Water-surface elevations on the Conemaugh River used in this study were taken from the Flood Insurance Study for the Township of St. Clair (Reference 2).

Cross-sectional data for the Conemaugh River were obtained from topographic maps compiled from aerial photographs taken in February 1984 at a scale of 1:4,800 (Reference 4). Additional field-surveyed cross sections were obtained for the Conemaugh River. All bridges were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals for the Conemaugh River were computed using the COE HEC-2 step-backwater computer program (Reference 5). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. The starting water-surface elevations were based on critical depth.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field inspection and verification of roughness requirements to reproduce profiles for known floods for which high-water marks were obtained and flow quantities were measured or easily calculated. The well-defined flood of July 1977 was successfully reproduced using channel "n" values for the Conemaugh River ranging from 0.014 to 0.045, and overbank "n" values ranging from 0.070 to 0.150.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800 with a contour interval of 4 feet (Reference 4).

For the stream studied by approximate methods, the 100-year floodplain boundaries were delineated using the Flood Hazard Boundary Map for the Township of East Wheatfield (Reference 6).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodway in this study is presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this study was computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodway is shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway widths for the Conemaugh River extend beyond the corporate limits.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Conemaugh River								
A	40.50	739	13,068	8.0	1,088.7	1,088.7	1,089.2	0.5
B	41.34	1,388	19,618	5.3	1,094.4	1,094.4	1,094.9	0.5
C	41.96	1,916	30,409	3.4	1,097.6	1,097.6	1,098.6	1.0
D	42.71	1,053	17,033	6.1	1,101.9	1,101.9	1,102.3	0.4
E	43.13	1,075	14,686	7.1	1,103.8	1,103.8	1,104.5	0.7
F	43.89	376	8,899	11.7	1,109.7	1,109.7	1,110.1	0.4
G	44.52	424	8,656	12.0	1,116.8	1,116.8	1,116.9	0.1
H	45.18	292	7,569	13.7	1,126.3	1,126.3	1,126.3	0.0

[1]Miles above mouth

[2]This width extends beyond corporate limits

TABLE 2

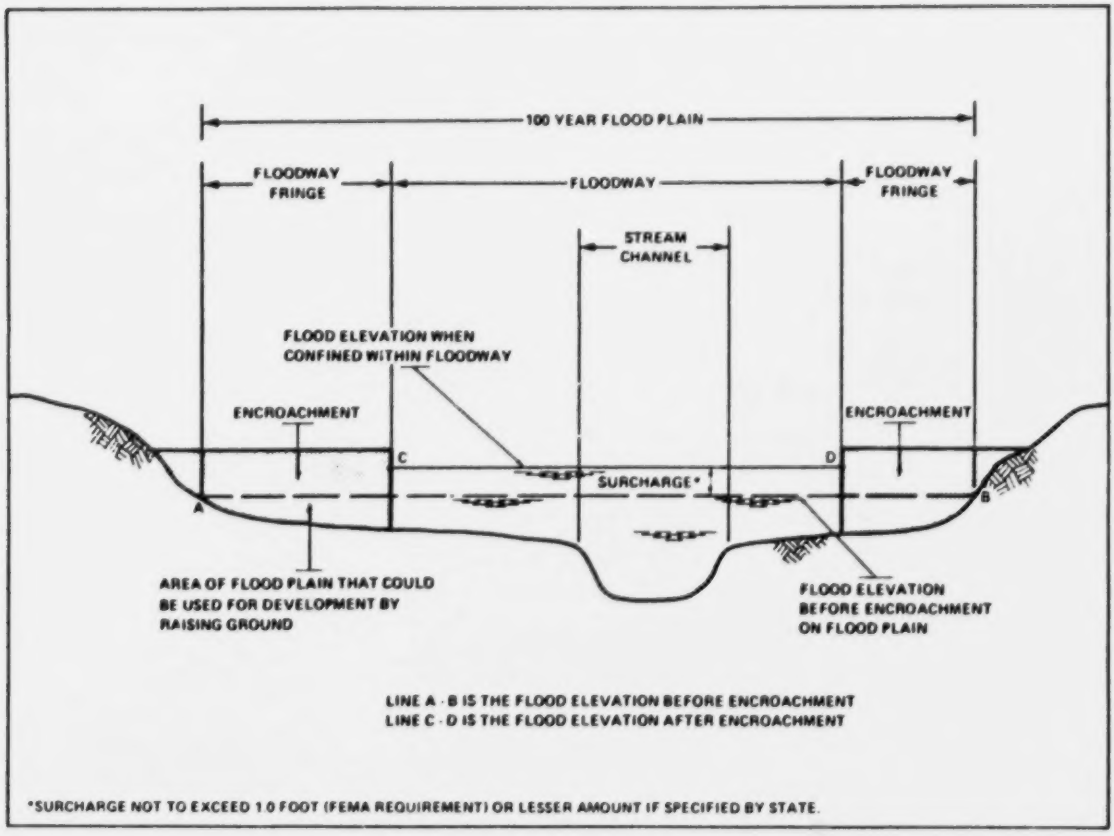
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST WHEATFIELD, PA

(INDIANA CO.)

FLOODWAY DATA

CONEMAUGH RIVER


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the Townships of St. Clair, Buffington, Jackson, and West Wheatfield and the Borough of Vintondale (References 2, 7, 8, 9, and 10). The results of this study are in exact agreement with the results of those studies.

Due to its more detailed nature, this study supersedes the Flood Hazard Boundary Map for the Township of East Wheatfield (Reference 6).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Pennsylvania, Washington, D. C., U. S. Government Printing Office, 1981.

2. Federal Emergency Management Agency, Flood Insurance Study, Township of St. Clair, Westmoreland County, Pennsylvania, Washington, D. C., September 18, 1987.

3. U. S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.

4. Michael Baker, Jr., Inc., Topographic Maps compiled from aerial photographs, Scale 1:4,800, Contour Interval 4 Feet: Beaver, Pennsylvania, February 1984.

5. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, October 1973.

6. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Township of East Wheatfield, Indiana County, Pennsylvania, July 15, 1977.

7. Federal Emergency Management Agency, Flood Insurance Study, Township of Buffington, Indiana County, Pennsylvania, Washington, D. C., August 1, 1986.

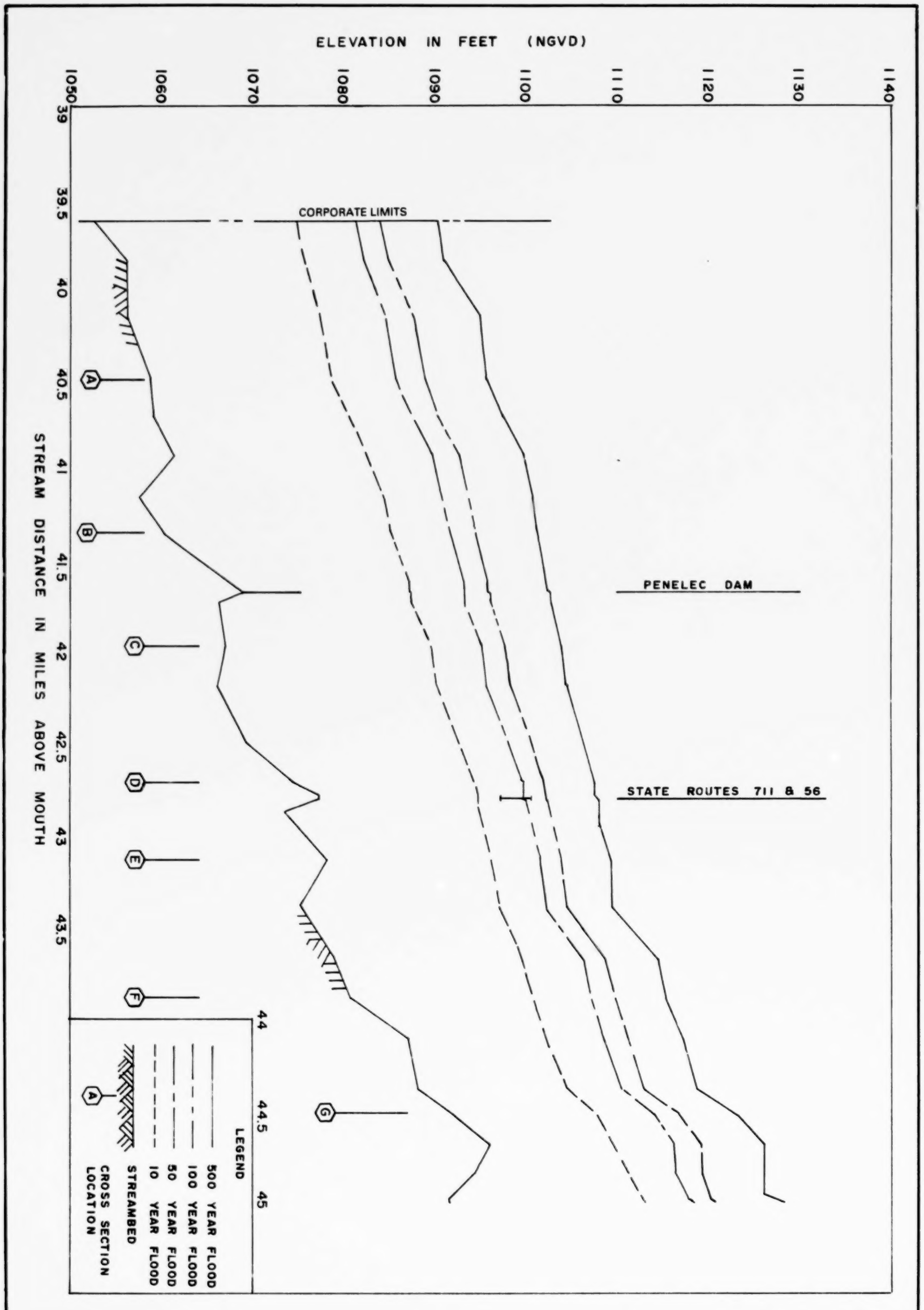
8. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Jackson, Cambria County, Pennsylvania, Washington, D. C., June 30, 1976.

9. Federal Emergency Management Agency, Flood Insurance Study, Township of West Wheatfield, Indiana County, Pennsylvania, Washington, D. C., March 19, 1990.

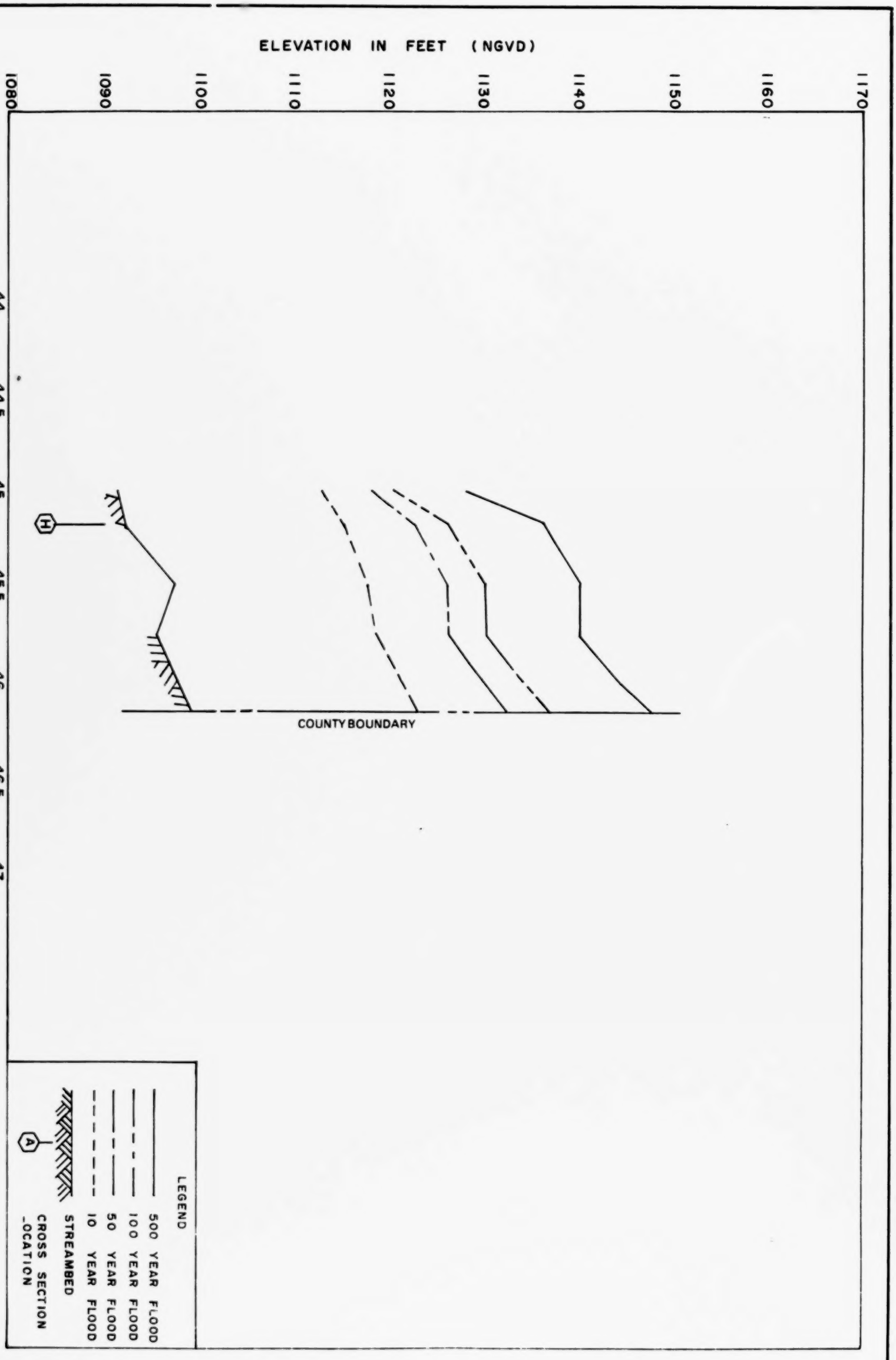
10. Federal Emergency Management Agency, Flood Insurance Study, Borough of Vintondale, Cambria County, Pennsylvania, Washington, D. C., April 2, 1990.

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	12	1,132.59	Chiseled square on headwall, approximately 30 feet south, approximately 12 feet east, and level with drive east; approximately 740 feet north along State Route 56 from intersection of State Route 56 and State Route 711.
RM 2	12	1,102.60	PDH disk, stamped WDK 1962 USGS, set on top of upstream left bank concrete wing wall of State Routes 56 & 711 bridge over the Conemaugh River at Hooverville.
RM 3	12	1,126.77	USC&GS disk, stamped P123-1941, set on top of concrete wall of five feet by four feet by seven feet deep drain for small stream under railroad track; approximately 124 feet southeast of south corner of south concrete base for signal bridge No. 283-1 and 283-2.



01P	FEDERAL EMERGENCY MANAGEMENT AGENCY TOWNSHIP OF EAST WHEATFIELD, PA (INDIANA COUNTY)	FLOOD PROFILES CONEMAUGH RIVER



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FEDERAL EMERGENCY MANAGEMENT AGENCY
TOWNSHIP OF EAST WHEATFIELD, PA
(INDIANA COUNTY)

FLOOD PROFILES

CONEMAUGH RIVER